

# Long-term changes in the flora and avifauna of Rabbit Island, Wilsons Promontory, Victoria

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## Abstract

Removal of European Rabbit *Oryctolagus cuniculus* from Rabbit Island, Wilsons Promontory, Victoria, by 1968 resulted in increased vegetation, including an expanded shrubland, and was associated with increased Short-tailed Shearwater *Ardenna tenuirostris* and Little Penguin *Eudyptula minor* populations. Seabirds and vegetation were described in 1959, and since 1965 vegetation changes and birds present were noted on numerous visits. In one series of observations between 1965 and 1988, 13 non-passerine and 11 passerine species were reported. In another series made between 1986 and 1988, two other passerines and six additional non-passerines were seen; a further seven passerines and an additional 15 non-passerines (mostly in small numbers, often flying over the island) were recorded between 1991 and 2002. Raptor species were frequently seen, but some sightings of non-passerines (usually seen flying over or off the island) and most passerines were infrequent. Most birds recorded were dispersive, nomadic or migratory. Plant species also increased, from 24 (including four alien species) reported in 1959 to some 70 (including 14 alien species) found in recent visits. Nevertheless, changes in the island's simple floristics have not resulted in any substantial increase in species of breeding birds. (*The Victorian Naturalist* 127 (5) 2010, 160-167).

**Keywords:** Rabbit Island, rabbit eradication, birds, plants, changes

## Introduction

Rabbit Island, some 2 km off the north-eastern coast of Wilsons Promontory, Victoria, is a small (c. 32.4 ha), domed granite island rising to about 60 m above sea level (Fig. 1). In 1959, the island had a 'sand-filled valley' inland above the beach (Gillham 1961), an eroded area which occupied some 6.5 ha in 1965 (Norman 1967, 1970). European Rabbit *Oryctolagus cuniculus* carcasses were numerous at that time, presumably reflecting a recent outbreak of myxomatosis. Subsequent baiting with '1080' (sodium fluoroacetate) removed the remaining individuals. Following this eradication, vegetation cover increased and the eroded area gradually disappeared, becoming colonised mainly by *Senecio lautus* and *Poa poiformis* among which various shrub species later became established (e.g. Norman 1970; Norman and Harris 1981; Norman 1988). Norman and Harris summarised aspects of vegetational changes on Rabbit Island between 1959 and 1979. In brief, they commented on the extensive changes along and above the sand beach region where some

species (e.g. *Rhagodia candolleana* syn. *bacata*) had increased in cover while others (e.g. *Cakile maritima*) declined; further changes in structure and vegetation were noted in March 1988 (Norman 1988). By 1979 the eroded area finally had disappeared and shrubs (*Leptospermum laevigatum*, *Acacia longifolia* and *Leucopogon parviflorus*) were extensive; indeed the shrubland extended from above the beach and across the island towards the summit in 1988. The number of vascular species recorded on the island in 1959 (24, including four alien species, Gillham 1961) had substantially increased by 1979 to 63, including 14 aliens (Norman and Harris 1981). A *Festuca* sp. was found in 1988 (Norman 1988). In the same period, breeding areas used by the Short-tailed Shearwater (for scientific names of birds see Table 1) expanded and bird species recorded on the island also increased, though representation was usually by sightings of single, 'transitory' individuals (Norman and Harris 1981).



Fig. 1. Oblique view of Rabbit Island, Wilsons Promontory, Victoria, September 2008 (courtesy of Nicole Schumann).

Unusually for most Bass Strait islands, there has been an extended series of visits to Rabbit Island since 1959. The island now has been without rabbits for over 40 years, and without fire for more than 50 years (Gillham 1961). This note presents a summary of observations on the island's flora and avifauna made between 1985 and 2002, and provides a brief comparison with material presented in previous studies.

### Methods

Considered here are records obtained: (i) in 1959 (e.g. Gillham 1961) and then by FI Norman (FIN) during irregular, mainly daylong, visits; nine between May 1965 and September 1968; others in 1978 and 1979 (see Norman and Harris 1981); (ii) between December 1985 and March 1988 by TL Montague (TLM) during regular (monthly) visits which lasted 3 days, when specific details for species other than Little Penguins were recorded during 20 visits from April 1986 onwards; (iii) during a three-day visit by FIN in March 1988 (see Norman 1988); and (iv) by the Penguin Study Group (PSG) of the Victorian Ornithological Research Group between February 1991 and January

2002. These were annual visits which lasted 1-3 days (see PSG reports, in references).

During visits between July 1987 and February 1988, trapping for mammals was undertaken on a grid established in *Acacia longifolia* and *Poa poiformis* just above the western sand beach, using 28 baited Elliot traps (TLM). Another trapping session was conducted between 27 October and 1 November 1995 (Dzedins 1995). Skinks were occasionally caught by hand.

### Results

#### Flora

##### Vegetation changes – species

By 1988, some 63 (including 13 alien) species of vascular plants had been recorded at Rabbit Island (Norman 1988). However, the PSG recorded some 14 or 15 plant species during their 1991 visit (Thoday 1991), adding three (*Myoporum insulare*, *Alyxia buxifolia* and *Sambucus gaudichaudiana*) to those previously recorded (although Gillham (1961) had previously recorded a *Sambucus* sp.). A more extended plant list compiled by PSG during the 1993 visit included 29 species, of which *Dicksonia antarctica*, *Coprosma repens*, an alien species that was

removed in 1997 (Thoday 1998), *Dichondra repens*, *Calystegia soldanella* and (perhaps) *Urtica incisa* were additional island species (Thoday 1995a). No new species were reported by Alison Oates (unpubl. data) in a list of some 15 species obtained during a visit in 1995, but the PSG added *Dichelachne crinata* in 1998 (Thoday 1999). In total, at least 70 vascular species have been recorded from the island, including 14 alien species.

#### Vegetation changes – general

By 1988, the vegetation of Rabbit Island was dominated by extensive tussock grassland *P. poiformis* communities, particularly at the northern and southern ends, and shrubland (dominated by *Acacia longifolia*) extended from the beach towards the island summit (Norman 1988). At this time (and as recorded earlier), the beach area generally was covered by the salt-bushes *Atriplex* and *Rhagodia*, although other species dominated some parts; cover by woody species in the eroded area had increased at the expense of *P. poiformis* (Norman 1988).

The PSG (Thoday 1991) indicated that shrubland extended from above the beach, across the summit, to the eastern coast. The tussock grassland then covered the remainder of the island although other plant species were 'sparsely scattered' elsewhere. Thistles (presumably *Carduus* sp.), which had been dry in 1991, were 'thick' behind the beach and isolated 'patches' occurred elsewhere (Thoday 1994); they were not apparent in 1994 when *Poa* growth was reduced (Thoday 1995b). Dzedins (1995) noted that *P. poiformis* dominated the island when visited in 1995, a time when there were extensive areas of *Rhagodia candolleana*, *Tetragonia tetragonoides* and patches of *Acacia sophorae*, *Myoporum insulare* and *Leptospermum laevigatum*. Dry conditions also affected the tussock grass (and some *Rhagodia*) in 2001, although the wattle *Acacia sophorae* was apparently 'thriving' (Unthank 2001). In 2002, shrubs had spread to form two 'large' areas, and the thistle (*Carduus tenuifloris*) was 'plentiful', whereas *Solanum laciniatum* had substantially declined (Unthank 2004). The tussock grassland and shrubland cover in September 2008 is indicated for the western side of the island in Fig. 1.

The mobility of the beach area was noted during many visits (e.g. Norman 1988; Thoday 1995a, 1995b), with substantial structural and floristic changes occurring between them.

For example, in 1988 the embryo dune had disappeared and the secondary dune was undercut, with *Cakile maritima* disappearing to be replaced by *Atriplex hastata* and *Rhagodia candolleana* (Norman 1988). Similarly, the PSG indicated that the beach was being eroded in February 1991 (Thoday 1991); it had disappeared in 1994 (Thoday 1995b) but was partially regenerated by 1998 (Thoday 1998).

#### Bird species

##### Little Penguin *Eudyptula minor*

Gillham (1961) considered that there were 'many hundreds' of burrows in 1959 and up to 500 were estimated in 1979 (Norman *et al.* 1980b; Norman and Harris 1981). This was considered an underestimate (Norman 1988) and visits between 1985 and 1988, when most Little Penguin nests were on the western side of the island, above and at each end of the sand beach (although droppings and occasional occupied nests were found elsewhere), suggested a burrow total of around 2500. By 1991 some 4000 burrows were estimated (Thoday 1991) although totals in 1995 and 1996 were considered much lower (Thoday 1995c, 1997). No later estimates are available.

##### Short-tailed Shearwater *Ardenna tenuirostris*

In 1959 there were 'many thousands' of burrows (Gillham 1961), and Harris and Norman (1981) estimated a total of around 131 000 (see also Norman *et al.* 1980b). While Gillham (1962) noted that there were few burrows in the sand-filled valley (i.e. the eroded area), with birds being unable to maintain them, by 1968 a part of this area had been colonised, a process which was well-advanced in 1978 (Norman and Harris 1981; Norman 1988). In the 1985–1988 period, Short-tailed Shearwaters nested across the island, wherever burrows could be formed, although few were found beneath *Acacia*, perhaps a consequence of difficult access and the tendency of associated soils to collapse. During visits by the PSG, a maximum of 210 000 burrows were estimated (Thoday 1991), but some declines were noted (e.g. in 1994, Thoday 1995b).

##### Cape Barren Goose *Cereopsis novaehollandiae*

Neither Gillham (1961) nor Dorward (1967) reported any Cape Barren Geese on Rabbit Island and they were similarly absent from 1965 to 1968 (Norman and Harris 1981). Geese were

**Table 1.** Bird species recorded at Rabbit Island, Wilsons Promontory, Victoria (maxima and/or comment). (Sequence, and common and scientific names follow Christidis and Boles 2008). Details from: <sup>1</sup> Norman and Harris (1981); <sup>2</sup> Norman (1988); <sup>3</sup> TLM unpublished; <sup>4</sup> PSG reports by Ron Thoday and Spencer Unthank. \* = breeding recorded; o/h = overhead; √ = present; x = alien.

Species	1965-1979 <sup>1</sup>	1988 <sup>2</sup>	1985-1988 <sup>3</sup>	1991-2002 <sup>4</sup>
Cape Barren Goose* <i>Cereopsis novaehollandiae</i>	18 (incl juveniles)		12 pairs	26 (including young)
Black Swan <i>Cygnus atratus</i>				4 (o/h)
White-throated Noddy <i>Hirundapus caudacutus</i>				2 (o/h)
Short-tailed Shearwater* <i>Ardenna tenuirostris</i>	see text	see text	see text	see text
Common Diving-Petrel <i>Pelecanoides urinatrix</i>				1 found dead
Little Penguin* <i>Eudyptula minor</i>	see text	see text	see text	see text
Australasian Gannet <i>Morus serrator</i>			√ (offshore)	11 (offshore)
Little Pied Cormorant <i>Microcarbo melanoleucos</i>			√	3
Great Cormorant <i>Phalacrocorax carbo</i>				3
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>			√	3
Black-faced Cormorant <i>Phalacrocorax fuscescens</i>	√			124
Eastern Great Egret <i>Ardea modesta</i>				1 (o/h)
White-faced Heron <i>Egretta novaehollandiae</i>	√		√	2
Australian White Ibis <i>Threskiornis molucca</i>				7 (o/h)
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>			√	3 (o/h)
Whistling Kite <i>Haliastur spheurnus</i>	√			1
Swamp Harrier <i>Circus approximans</i>	√		√	3
Wedge-tailed Eagle <i>Aquila audax</i>				2 (o/h)
Nankeen Kestrel <i>Falco ceenchroides</i>	√			1 (o/h)
Brown Falcon <i>Falco berigora</i>	√		√	1 (o/h)
Peregrine Falcon* <i>Falco peregrinus</i>	√	2	√	4
Australian Pied Oystercatcher <i>Haematopus longirostris</i>				2
Sooty Oystercatcher* <i>Haematopus fuliginosus</i>	3 nests		√*	12+
Latham's Snipe <i>Gallinago hardwickii</i>				1
Bar-tailed Godwit <i>Limosa lapponica</i>				1
Caspian Tern <i>Hydroprogne caspia</i>				1
Crested Tern* <i>Thalasseus bergii</i>			√*	220
Pacific Gull* <i>Larus pacificus</i>	5 nests		√	52
Kelp Gull <i>Larus dominicanus</i>			√	
Silver Gull* <i>Chroicocephalus novaehollandiae</i>	27 nests		√*	20
Yellow-tailed Black-Cockatoo <i>Calyptorhynchus funereus</i>				7 (o/h)
Sulphur-crested Cockatoo <i>Cacatua galerita</i>				1 (o/h)
Blue-winged Parrot <i>Neophema chrysostoma</i>				1
Pallid Cuckoo <i>Cacomantis pallidus</i>				1
Superb Fairy-wren <i>Malurus cyaneus</i>	√			
Yellow-faced Honeyeater <i>Lichenostomus chrysops</i>				2
White-eared Honeyeater <i>Lichenostomus leucotis</i>				1
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>				1
Olive Whistler <i>Pachycephala olivacea</i>				1
Australian Magpie <i>Cracticus tibicen</i>	√			
Grey Fantail <i>Rhipidura albiscapa</i>			√	2
Forest Raven* <i>Corvus tasmanicus</i>	?	41	√	75
Satin Flycatcher <i>Myiagra cyanoleuca</i>				1
Flame Robin <i>Petroica phoenicea</i>			√	
*Eurasian Skylark <i>Alauda arvensis</i>	√		√	
Little Grassbird <i>Megalurus gramineus</i>				3
Silvereye <i>Zosterops lateralis</i>	√	20+	√	20
Welcome Swallow* <i>Hirundo neoxena</i>	√		√	9
Fairy Martin <i>Petrochelidon ariel</i>	√			
Tree Martin <i>Petrochelidon nigricans</i>				2 (o/h)
*Common Blackbird <i>Turdus merula</i>	√			2
*Common Starling <i>Sturnus vulgaris</i>	√			
Australasian Pipit <i>Anthus novaeseelandiae</i>	√			
*European Goldfinch <i>Carduelis carduelis</i>	√			1

**Table 2+.** Species:area ratios for vascular plants found on some Wilsons Promontory islands, listed in the order of increasing exposure as estimated by Gillham (1961).

Island	Total		Proportion of native species (%)	Ranking by native proportion	Area (ha)	Species:Area Ratios		Adjusted ranking (ratio for native species)
	Vascular species	Native species				All species	Native species	
Granite <sup>1</sup>	22	15	68.2	7	1.1	20.9:1	14.2:1	1
Rabbit <sup>2</sup>	70	56	80.0	6	32.4	2.2:1	1.7:1	4
Cliffy <sup>3</sup>	41	23	56.1	8	7.7	5.3:1	3.0:1	2
McHugh <sup>4</sup>	18	18	100.0	1	9.2	1.9:1	1.9:1	3
Dannevig <sup>5</sup>	25	23	92.0	3	19.6	1.3:1	1.2:1	5
Citadel <sup>6</sup>	25	21	84.0	5	18.8	1.3:1	1.1:1	6
Wattle <sup>7</sup>	27	24	88.9	4	21.4	1.3:1	1.1:1	6
Norman <sup>7</sup>	27	26	96.3	2	48.0	0.6:1	0.5:1	7

<sup>1</sup> Gillham (1961) and unpublished data. <sup>2</sup> Gillham (1961), Norman (1970, 1988), this study. <sup>3</sup> Hope and Thomson (1971). <sup>4</sup> Gillham (1961) and unpublished data. <sup>5</sup> Gillham (1961), Norman *et al.* (1980a). <sup>6</sup> Norman and Brown (1979). <sup>7</sup> Norman *et al.* (1980a).

first recorded, and breeding, on the island in 1978 (8 adults and 2 young) and 18 (including 2 or more juveniles) were seen in 1979 (Norman *et al.* 1980b; Norman and Harris 1981). Numbers of geese varied considerably (1–30) between 1985 and 1988, with apparent peaks in August when egg-laying was at a maximum. Nests were found under the *Acacia* shrubs near the summit and on the western slopes, and up to 12 pairs bred. The PSG recorded geese on every visit, and up to 26 (including young) were seen in 1992 (Thoday 1994).

Other bird species

In 1959, only seabirds present (or breeding) on Rabbit Island were reported (e.g. Gillham 1961), but Norman and Harris (1981) provided a listing of 24 species (including an unidentified corvid) for the island (see Table 1). The PSG found a carcass of a diving-petrel, presumably *Pelecanoides urimatrix* (Unthank 2001), although to date no nests have been found. Other seabirds have been seen roosting on rocks (e.g. some 124 Black-faced Cormorants *Phalacrocorax fuscescens* seen in 1994; Thoday 1995b) or offshore. Three nests of Sooty Oystercatchers *Haematopus fuliginosus* were found in 1978–1979 (Norman *et al.* 1980b), breeding was recorded in 1986–1988 and in the 1991–2002 period, nests were found during most visits, with a maximum of nine nests in 1999 (Thoday 2001). Silver Gulls *Chroicocephalus novaehollandiae* were recorded as a breeding

species in 1979. There were 27 nests, and some 100 pairs (Norman and Harris 1981). Breeding was also observed in 1986–1988 and late 1995. Crested Terns *Thalasseus bergii* were first seen nesting on the island in 1986–1988 on the western coast, about 100 m north of the beach, just in front of areas where *P. poiformis* reached the exposed granite. In 1999, some 220 terns were seen, but no breeding was observed (Thoday 2001). No breeding Pacific Gulls *Larus pacificus* were seen in 1959, but five nests were found in 1979 (Norman *et al.* 1980b). However, while no breeding was observed between 1986 and 1988, the PSG found up to 16 nests in the 1991–2002 period (although juvenile Pacific, and Kelp *Larus dominicanus*, Gulls were seen between 1986 and 1988). Other non-passerines (Table 1) were seen flying over, e.g. Black Swans *Cygnus atratus* (Thoday 1991) and Sulphur-crested Cockatoo *Cacatua galerita* (Thoday 1995a), or occasionally on, the island, e.g. one Bar-tailed Godwit *Limosa lapponica* (Thoday 1995a) and one Latham's Snipe *Gallinago hardwickii* (Thoday 1995c).

In the review period, species of birds of prey recorded have increased. While Peregrine Falcons *Falco peregrinus* were observed from 1965 onwards (and assumed to breed in the eastern cliffs), they were present on 12 of 20 visits between 1986 and 1988, and one to four birds were seen during seven of eleven visits between 1991 and 2002. Swamp Harriers *Circus approximans* (maximum eleven), Brown Falcons *Falco ber-*

igora and White-bellied Sea-Eagles *Haliaeetus leucogaster* were regular visitors, but Wedge-tailed Eagles *Aquila audax* were less frequently seen over the island.

Despite regular visits between 1986 and 1988, relatively few passerine species were seen on a regular basis, but Grey Fantail *Rhipidura albiscapa* and Flame Robin *Petroica phoenicea* were added to the island list in this period. PSG visits added another seven passerine species, including honeyeaters (Table 1). Welcome Swallow *Hirundo neoxena* nests were reported on several PSG visits. The Forest Raven *Corvus tasmanicus* appears to have bred only occasionally (Thoday 1991), although the species regularly visits the island (75 seen in 1991).

#### Skinks and mammals

When visited in December 1978, a 'lizard' and 'rat' were seen (MP Harris pers. comm.); somewhat later (1985-1988) TLM recorded an extensive population of Swamp Antechinus *Antechinus minimus*, and found that the Water Skink *Eulamprus tympanum* was widespread. However, while Dzedins (1995) reported *Egernia whitii* (as well as commenting on *A. minimus*), Thoday (2001) noted the apparent confusion relating to the identity of the skink species and favoured *E. tympanum*.

#### Discussion

When Gillham (1960, 1961, 1962) reviewed the floristics of some Promontory islands (including Rabbit Island) she visited in 1959, she developed a ranking which showed that plant species per unit area decreased with increasing 'exposure', and noted that species totals were depressed by seabird activities, rabbit grazing, reduced soil depth and salt spray. To some extent, the indices improved when only native species were considered (e.g. Hope and Thomson 1971). Vegetation details for some islands visited previously by Gillham have improved, for example, Citadel Island (Norman and Brown 1979, Dannevig Island (Norman *et al.* 1980a), and Rabbit Island (summarised here) where visits have been extensive since 1959. Thus by 1998, some 70 vascular species (including 14 aliens) had been recorded there, a substantial increase when compared with the list of 24 (4) provided by Gillham (1961), a list which resulted in a species:area ratio of 0.7:1 in 1959 (using an island area of 32.4 ha; Norman 1970). Gillham (1961) felt that rabbits had depressed totals

recorded. Later collections that followed rabbit removal showed an increase in the species total, by at least 46 (10) species, and hence raised the ratio for all species per unit area to 1:0.5, as reported by Norman *et al.* (1980a). To some extent then, removal of rabbits and the continued absence of fires have been followed by an increase in the island's flora, as has also occurred on Citadel Island (Norman and Brown 1979), hence supporting Gillham's views. Nevertheless, revision of plant lists for selected Promontory islands (Table 2) suggests that Cliff Island (with a large proportion of alien species, and the lowest native species:area ratio) is perhaps, paradoxically, less 'exposed' than other islands. Indeed Norman Island, the largest of the islands considered here, would now appear to have the lowest ratio and, following Gillham, is probably the most influenced by exposure. Further, it should be noted that 'new' plant records may be of isolated (perhaps temporary) individuals rather than well-established communities.

The influence of human activities has been considered in previous discussions on the vegetation of Promontory and Bass Strait islands. Thus the modification of the floristics in the Hogan Group (Hogan, Long and East Islands) was seen as a consequence of frequent burning and grazing by cattle; some 40% of plants found on Hogan Island itself were alien species, introduced by or with stock (Scarlett *et al.* 1974). At Cliff Island, where a lighthouse was established in 1884, a similar proportion of alien herbs has been recorded (Hope and Thomson 1971). Increased alien content also has been noted for other local islands where occupation, cutting and burning of shrub species has occurred; other islands with a low alien content (see Table 2) may reflect an absence of human disturbance (e.g. Norman *et al.* 1980a; Norman 1988). Further, the role of frugivorous bird species in the spread of some plant species (both alien and native) should not be ignored.

During Gillham's 1959 visit to Rabbit Island, observations were made only on seabirds present (e.g. Gillham 1961). In nine later visits between 1965 and 1968 (Norman 1970), in late 1978 and 1979 (three visits, Norman and Harris 1981) and March 1988 (Norman 1988) other bird species, including passerines, were recorded and the island's bird list had reached some 24 species (13 non-passerines; 11 passerines including the unidentified corvid—

presumably the Forest Raven; see Table 1) by that time. Observations made on regular visits between early 1986 and early 1988 added two passerines (Grey Fantail and Flame Robin) and six non-passerines (including birds seen on, over or around the island), one (Crested Tern) recorded breeding apparently for the first time. The visits by the PSG between 1991 and 2002 added a further seven passerines and 15 non-passerines (including several flying over the island), with the result that 54 species (34 non-passerines and 20 passerines) have now been recorded. Of the non-passerines, raptors were well-represented (several being reported frequently) as was a range of shorebirds (though these were often seen only once). As noted previously (e.g. Norman and Harris 1981; Norman 1988), few of the passerine species inhabit the island regularly or indeed breed there, with most being single sightings of transitory individuals rather than resident species; more recent observations tend to support this view. Indeed, few if any of the passerines are regularly observed and, of the 20 passerines recorded (Table 1), most are considered to show dispersive, migratory, or nomadic movements (Garnett *et al.* 1991, Pizzey and Knight 2007) and only the raven has been reported to breed on the island. To some considerable extent, the small numbers of breeding species reflects the island's simple floristics and vegetation structure, and the reduced shrub cover. Indeed, on an unidentified 300 ha island elsewhere in Bass Strait, where sheep and deer have been eliminated and revegetation has been substantial, a range of birds now occurs, including honeyeaters and other migrants (Johns 2008). In this regard, Abbott (1973) noted that smaller Bass Strait islands had a depauperate avifauna as a result of reduced immigration and invasion rates, and an absence of *Eucalyptus* species; removal of scrub, grazing and burning must also play local roles.

As the number of bird species recorded on and around Rabbit Island has increased, so too have populations of several species also grown. Early records of Little Penguins suggested burrow totals of some hundreds (Gillham 1961), but later observations considered that up to 4 000 were present (Thoday 1991). Similarly, the number of Short-tailed Shearwater and their extent have also increased, from the '(m) any thousands' in 1959 (Gillham 1961) to an es-

timated total of around 131 000 in 1978 (Harris and Norman 1981) and 210 000 in 1991 (Thoday 1991), a total subsequently reduced (to 100 000 in 1995 (Thoday 1995c). Shearwaters' burrows had advanced considerably into the previously eroded areas now mainly stabilised by *Poa poiformis*. Further, the Cape Barren Goose, which was not seen on the island before 1978 when breeding was first recorded, now breeds in substantial numbers, and its increase is likely to have resulted from reduced persecution elsewhere around Wilsons Promontory, and perhaps improved forage on the island itself (following rabbit removal).

In contrast to many control operations conducted elsewhere (see Reddiex *et al.* 2006), the removal of rabbits from Rabbit Island has been followed for many years. In the study period from 1965 (if not 1959) to 2002, eroded areas have disappeared and have been covered by local vegetation, cover by shrub species has increased (and used by a nesting passerine, the Forest Raven), population growth of shearwaters and penguins has occurred, Cape Barren Geese have established numerous breeding pairs, and a range of passerine species has been recorded in the enhanced flora, whose unburnt development has been more than 'anecdotal' (Reddiex and Forsyth 2006). Nevertheless, the bird species recorded on the island may be transients rather than residents, perhaps reflecting the relatively 'simple' vegetation communities present. The increase in biodiversity of plants and birds and the apparent increase in abundance of burrowing seabirds on Rabbit Island following the removal of rabbits, strongly supports their removal from other Bass Strait islands, such as Lady Julia Percy (Dann *et al.* 2004).

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